

WHAT IS CLAIMED IS:

1. A liquid delivery adapter for use in delivering a liquid from a liquid source to a gas mask, the adapter comprising:

a body having a first end and a second end;

an inlet opening formed at the second end and an outlet opening formed at the first end;

an interior chamber formed within the body;

an inlet chamber extending from the inlet opening to the interior chamber;

an outlet chamber extending from the outlet opening to the interior chamber, wherein the inlet opening, inlet chamber, interior chamber, outlet chamber, and outlet opening define a flow path when placed in open communication with each other to permit the liquid to flow through the flow path; and

a stopper disposed within the interior chamber and extending into the outlet chamber, wherein the stopper controls the flow of the liquid through the flow path.

2. The adapter according to claim 1, wherein the inlet chamber extends along a first axis and the outlet chamber extends along a second axis.

3. The adapter according to claim 2, wherein an angle θ defined by the first axis and the second axis is in a range of 5° to 175° .

4. The adapter according to claim 2, wherein the interior chamber includes a longitudinal axis that is coaxial with the second axis.

5. The adapter according to claim 1, further comprising a plunger disposed within the inlet chamber a predetermined distance from the inlet opening.

6. The adapter according to claim 1, wherein the interior chamber defines an opening which communicates with an exterior of the adapter, and wherein the interior chamber opening is opposite the outlet opening along at least one of the second axis and the longitudinal axis of the interior chamber.

7. The adapter according to claim 6, wherein the interior chamber opening is circular in shape.

8. The adapter according to claim 6, further comprising a lip defined by a lower portion of the interior chamber, the lip being disposed intermediate the interior chamber opening and the outlet opening along the longitudinal axis of the interior chamber.

9. The adapter according to claim 1, wherein the stopper can be biased between a first position, wherein the liquid is prevented from flowing through the flow path, and a second position, wherein the liquid is permitted to flow through the flow path.

10. The adapter according to claim 9, further comprising biasing means for biasing the stopper between the first position and the second position.

11. The adapter according to claim 10, wherein the biasing means is a spring.

12. The adapter according to claim 1, wherein the stopper comprises a flange and a rod-shaped lower portion extending from a lower surface of the flange, the flange of the stopper resting within the interior chamber and the rod-shaped lower portion of the stopper extending into the outlet chamber.

13. The adapter according to claim 12, wherein the flange has an outer diameter larger than an outer diameter of the rod-shaped lower portion.

14. The adapter according to claim 12, further comprising a retainer extending from an upper surface of the flange and biasing means for biasing the stopper between a first position which prevents the liquid from flowing through the flow path, and a second position which permits the liquid to flow through the flow path, and wherein the biasing means is disposed about the retainer and abuts the upper surface of the flange.

15. The adapter according to claim 12, wherein the rod-shaped lower portion of the stopper includes a plurality of arms defining a plurality of longitudinal channels through which the liquid can flow, wherein each longitudinal channel is defined by a pair of neighboring arms.

16. The adapter according to claim 12, further comprising a first gasket disposed about the rod-shaped lower portion of the stopper and abutting the lower surface of the flange.

17. The adapter according to claim 16, wherein the gasket is an O-ring.

18. The adapter according to claim 14, further comprising a first gasket disposed about the rod-shaped lower portion of the stopper and abutting the lower surface of the flange, an opening defined by the interior chamber, wherein the interior chamber opening communicates with an exterior of the adapter, and a lid which closes the interior chamber opening and compresses the biasing means toward the outlet chamber to create an airtight seal at an interface of the interior chamber opening and the lid.

19. The adapter according to claim 1, wherein the inlet opening is connectable with the liquid source and the outlet opening is connectable with the gas mask.

20. A gas mask liquid delivery system comprising;

a gas mask having a liquid inlet port;

a liquid control adapter, the adapter comprising:

- a body having a first end and a second end;
- an inlet opening formed at the second end and an outlet opening formed at the first end;
- an interior chamber formed within the body;
- an inlet chamber extending from the inlet opening to the interior chamber;
- an outlet chamber extending from the outlet opening to the interior chamber, wherein the inlet opening, inlet chamber, interior chamber, outlet chamber, and outlet opening define a flow path when placed in open communication with each other to permit the liquid to flow through the flow path; and
- a stopper disposed within the interior chamber and extending into the outlet chamber, wherein the stopper controls the flow of the liquid through the flow path

wherein the outlet opening connects the liquid control adapter directly to the liquid inlet port of the gas mask;

- a liquid source;
- a connector; and
- a flow tube which connects the liquid source to the connector, wherein the inlet opening of the liquid control adapter is connected to the connector.

21. The gas mask liquid delivery system according to claim 20, wherein the inlet chamber extends along a first axis and the outlet chamber extends along a second axis, wherein an angle θ defined by the first axis and the second axis is in a range of 5°

to 175°, and wherein the interior chamber includes a longitudinal axis that is coaxial with the second axis.

22. The gas mask liquid delivery system according to claim 20, further comprising a plunger disposed within the inlet chamber a predetermined distance from the inlet opening.

23. The gas mask liquid delivery system according to claim 20, wherein the interior chamber defines a circular shaped opening which communicates with an exterior of the adapter, and wherein the interior chamber opening is opposite the outlet opening along at least one of the second axis and the longitudinal axis of the interior chamber.

24. The gas mask liquid delivery system according to claim 23, wherein the liquid control adapter further comprises a lip defined by a lower portion of the interior chamber, the lip being disposed intermediate the interior chamber opening and the outlet opening along the longitudinal axis of the interior chamber.

25. The gas mask liquid delivery system according to claim 20, wherein the liquid control adapter further comprises biasing means for biasing the stopper between a first position, wherein the liquid is prevented from flowing through the flow path, and a second position, wherein the liquid is permitted to flow through the flow path.

26. The gas mask liquid delivery system according to claim 25, wherein the biasing means is a spring.

27. The gas mask liquid delivery system according to claim 20, wherein the stopper of the liquid control adapter comprises a flange and a rod-shaped lower portion extending from a lower surface of the flange, the flange of the stopper resting within the

interior chamber and the rod-shaped lower portion of the stopper extending into the outlet chamber.

28. The gas mask liquid delivery system according to claim 27, wherein the flange of the stopper has an outer diameter larger than an outer diameter of the rod-shaped lower portion.

29. The gas mask liquid delivery system according to claim 27, wherein the liquid control adapter further comprises a retainer extending from an upper surface of the flange and biasing means for biasing the stopper between a first position which prevents the liquid from flowing through the flow path, and a second position which permits the liquid to flow through the flow path, and wherein the biasing means is disposed about the retainer and abuts the upper surface of the flange.

30. The gas mask liquid delivery system according to claim 27, wherein the rod-shaped lower portion of the stopper includes a plurality of arms defining a plurality of longitudinal channels through which the liquid can flow, wherein each longitudinal channel is defined by a pair of neighboring arms.

31. The gas mask liquid delivery system according to claim 27, wherein the liquid control adapter further comprises a gasket disposed about the rod-shaped lower portion of the stopper and abutting the lower surface of the flange.

32. The gas mask liquid delivery system according to claim 31, wherein the gasket is an O-ring.

33. The gas mask liquid delivery system according to claim 29, further comprising a gasket disposed about the rod-shaped lower portion of the stopper and abutting the lower surface of the flange, an opening defined by the interior chamber,

wherein the interior chamber opening communicates with an exterior of the adapter, and a lid which closes the interior chamber opening and compresses the biasing means toward the outlet chamber to create an airtight seal at an interface of the interior chamber opening and the lid.

34. A gas mask liquid delivery system comprising;

a gas mask having a liquid inlet port;

a liquid control adapter, the adapter comprising:

a body having a first end and a second end;

an inlet opening formed at the second end and an outlet opening formed at the first end;

an interior chamber formed within the body;

an inlet chamber extending from the inlet opening to the interior chamber;

an outlet chamber extending from the outlet opening to the interior chamber, wherein the inlet opening, inlet chamber, interior chamber, outlet chamber, and outlet opening define a flow path when placed in open communication with each other to permit the liquid to flow through the flow path; and

a stopper disposed within the interior chamber and extending into the outlet chamber, wherein the stopper controls the flow of the liquid through the flow path

wherein the outlet opening connects the liquid control adapter directly to the liquid inlet port of the gas mask;

a liquid source; and

a flow tube which connects the liquid source to the adapter, wherein the inlet opening of the liquid control adapter is connected to the liquid source.